or mixed Negro descent, and mostly pagans or nominal Muhammadans. The rest belong to various branches of the Semitic and Hamitic stocks, and are nearly all Muhammadans of a more or less fanatical type. In his valuable "Report on the Sudan for 1883" Lieut.-Col. Stewart remarks: "Besides the main division of the people into Arab and Negro, they are again subdivided into a number of tribes and sub-tribes, some sedentary and others nomad. Of the Negro tribes all are sedentary and cultivators, but the Arabs are for the most part nomads or wanderers, each tribe within certain well-known limits. All these Arab tribes are large owners of cattle, camels, horses, and slaves. These last, along with the Arab women, generally cultivate some fields of doora (a kind of millet) or corn, sufficient for the wants of the tribe. The Arab himself would consider it a disgrace to practise any manual labour. He is essentially a hunter, a robber, and a warrior, and, after caring for his cattle, devotes all his energies to slave-hunting and war" (p. 8).

This presents a fairly accurate picture of the natural relations of the people in all respects except as regards the main division into two ethnical groups—Arab and Negro. From what has been already stated it is obvious that this is a totally inadequate distribution. It is another and signal instance of that official ignorance or disregard of the racial conditions that has ever been such a fruitful source of political troubles and disasters in lands governed or controlled by foreign administrators. As a matter of fact, Egyptian Sudan is a region of great ethnical complexity, and so far from being occupied by Arabs and Negroes alone, there are scarcely any Arabs or Negroes at all anywhere east of the Nile between Khartum and Egypt. To designate as Arabs the tribes at present blocking the Suakin-Berber route, as is currently done, betrays a depth of ethnological ignorance analogous to that of the writer who should group Basques, for instance, and Slavs in the same category. The Arabs themselves are comparatively recent intruders, although it is possible that some, such as the Beni-Omr, now fused with the Funj and Hamagh Negroid peoples of Senaar, may have found their way across the Red Sea into the Nile basin in pre-Muhammadan times. But the Bishari tribes about Suakin are the true autochthonous element, lineal descendants of the Blemmyes and other historic peoples whose names are enrolled in Greek, Roman, and Axumite records. But these and other points will be made clear by the above synoptical table, with accompanying map, of the East Sudanese races and tribes.

Khartum, the centre of administration for all these discordant elements, has been brought within the sphere of civilisation since 1819, when it was occupied by the Egyptian troops under Ismael Pasha. At that time it was a mere outpost of the Hamagh kingdom, Senaar; but, thanks to its convenient position at the confluence of the two Niles midway between the Mediterranean and the equator, it soon rose to importance under the strong government of Mehemet Ali. Under Khurshid Pasha (1826–37) its skin and reed hovels were replaced by substantial brick houses, and at present it is by far the largest and most flourishing place in Central Africa, with a motley population of over 40,000, including the garrison troops. Here considerable quantities of goods in transit are always in deposit; here are resident many Europeans interested in the African trade, and in the more philanthropic work of African culture and exploration. Khartum has thus become inseparably associated with all the work done during the last half century towards developing the material resources of the land and raising the moral status of its inhabitants. At its mention, the names of Petherick, Beltrami, Schweinfurth, Baker, Gordon, Marno, Junker, Linant de Bellefonds, Emin Bey, Gessi, and many other heroic pioneers in the cause of African progress, are irresistibly conjured up. Such names plead silently but eloquently for its preservation to civilisation in the better sense of the word, and make us feel how great a crime against humanity would be its abandonment to barbarism and the villainous Arab slave-dealers of Central Africa.

A. H. KEANE

NOTES

WE understand that subscriptions to a memorial to the late Mr. F. Hatton are being asked for in a paper in which the name of Prof. Huxley is mentioned as one of the committee and an intending subscriber. We are authorised to state that the name of Prof. Huxley has been employed without his knowledge.

WE have received the following subscriptions on behalf of the Hermann Müller Fund:—Prof. W. H. Flower, F.R.S., 1*l.*; Mr. W. E. Hart, 1*l.*; K., 10*s*.

MR. FRANK E. BEDDARD, M.A., of the University of Oxford, Naturalist to the *Challenger* Commission, has been selected out of thirteen candidates for the post of Prosector to the Zoological Society of London, in succession to the late Mr. W. A. Forbes. Mr. Beddard was a pupil of the late Prof. Rolleston, and for the past year has been employed on editorial and other work connected with the issue of the official reports on the scientific results of the *Challenger* Expedition. He has also been intrusted with the examination and description of the *Isopoda* collected by the Expedition, and has the reputation of being a most promising and enthusiastic naturalist.

AMONG other legacies in the will of the late Sir William Siemens are 1000*l.* each to the Scientific Relief Fund of the Royal Society and the Benevolent Fund of the Institution of Civil Engineers.

THE Cunningham Medal of the Royal Irish Society was presented on the 15th inst. to Mr. John Birmingham of Tuam, for his "Contributions to the Advancement of Knowledge in Astronomy."

MR. ARCHIBALD GEIKIE, F.R.S., Director-General of the Geological Survey of the United Kingdom, will give the first of a course of five lectures on the Origin of the Scenery of the British Isles, on Tuesday next (January 29), at the Royal Institution of Great Britain.

IN January, 1883, one of the officers of the Geological Survey of Ireland, Mr. E. T. Hardman, was selected to proceed to Western Australia for the purpose of taking part in an exploration of the Kimberley district of that colony. He took the field in April last, and continued on active service in the bush until near the end of September, having in this interval travelled at least 1500 miles, and having obtained materials for a first geological sketch-map of about 12,800 square miles of country. He has determined the sequence of formations which begin with certain quartzites, schists, and other metamorphic rocks, which he classes provisionally as altered Lower Silurian, but which may be of Archæan age. These are succeeded by limestones and sandstones with gypsum, &c., which are referred to Upper Carboniferous horizons. Certain basalts and felstones occur, the age of which is uncertain. The youngest deposits are Pliocene sands, gravels, conglomerates, and marly limestones ("pindar" of the natives) overlaid by river gravels, extensive plains of alluvium, and, along the sea-coast, by raised beaches.

MR. BARNUM'S so-called white elephant arrived safely last week at the Zoological Gardens from Burmah, and has already attracted many visitors. Prof. Flower, writing to the *Times*, says:—"The Burmese elephant now deposited in the Zoological

Society's Gardens, Regent's Park, is apparently not quite full grown, being between 7 feet and 8 feet in height, and has a well-formed pair of tusks about 18 inches in length. It has a remarkably long tail, the stiff bristly hairs at the end of which almost touch the ground. The ears are somewhat larger than in the ordinary Indian elephant, and are curiously jagged or festooned at the edges, whether as a natural formation or the result of early injuries it is difficult to say. It is chiefly remarkable, however, for a peculiarity of coloration which is quite unlike that of any elephant hitherto brought to this country. In this elephant the general surface of the integument is quite as dark as, if not darker than, that usually seen in its kind, being, perhaps, of rather a more bluish or slaty hue. There are, however, certain definite patches, disposed with perfect bilateral symmetry, in which the pigment is entirely absent, and the skin is of a pale reddish brown or 'flesh colour.' These patches are of various sizes, sometimes minute and clustered together, producing only an indistinct mottling of the surface, sometimes in large clear spaces, but which are mostly, especially at their edges, dotted over with circular pigmented spots of the prevailing dark colour about half an inch or more in diameter, which give a remarkable and even beautiful effect. The largest and clearest light-coloured tract is on the face, extending from the level of the eyes to the base of the trunk. . . . The animal is not a pale variety of the ordinary elephant, as some have supposed the so-called 'White Elephant' to be, but one characterised by a local deficiency of the epidermic pigment, in symmetrically disposed patches, and chiefly affecting the head and anterior parts of the body. It does not result from any disease of the skin, as has been suggested, but is doubtless an individual congenital condition or defect."

In *Cosmos les Mondes* for January 19 Prof. P. Guy describes the remarkable sunrise witnessed by him at Perpignan on January 8. From his bedroom window, looking southwards, he noticed a sudden flash, which lit up the whole room, and which was followed by a lovely pale light diffused throughout the southern sky from horizon to zenith. This was at 4 a.m., and consequently could not have been produced by the clouds reflecting the light of the moon, which had set at 2.42 a.m. The luminous matter presented a milk-white appearance, not unlike that of the Milky Way, and scarcely more intense. So transparent was it that the stars remained perfectly visible without any diminution of their brightness through the vapours which seemed to cause the effulgence. Mars and Jupiter, visible near the zenith, were encircled by a halo like that often visible round the moon. Along the southern horizon there stretched a dark band formed by clouds at an elevation of about 15°, the upper edge of which was lit up intermittently by the action of successive waves of light resembling the sheet lightning so often seen in summer. About 4.45 a.m. the light gradually faded away, after which the sky became overcast and quite dark. The local and intermittent light, Prof. Guy thinks, was obviously due to electricity, to which with less certainty may also be attributed the more general manifestation. The upper regions of the atmosphere contain a large quantity of electricity, as shown by the potential increasing with the increased altitude. To its presence are probably due such faint and phosphorescent diffusions of light as are here described, and have often been observed elsewhere.

After more than a fortnight's working without the slightest hitch of any kind, the experiment of the direct electric lighting of one of the District Railway trains between Kensington and Putney may, it is stated, be fairly looked upon as a distinct success. The fitting of the Putney train is of a rather heterogeneous character, being a collection of plant procurable without special manufacture, the whole consisting of a launch boiler, a small Willan's three-cylinder steam-engine, running at 500 revolutions, and driving direct off its own shaft, a Siemens' shunt-wound dynamo supplying current for 50 Swan 20-candle power incandescent lights. In addition there are two water-tanks, and a coal-box, the whole being placed in a separate van, and this tentative arrangement has this advantage—that by the removal of the van to other lines more extended trials can be made on longer trains, as in the present case only 30 of the lamps are employed for the actual service of the train, the remaining 20 being kept lighted in the van itself. The effect on the train is very brilliant, although the arrangements are not what are ultimately proposed—namely, to place a small high-speed engine and the dynamo on the tender and take steam from the locomotive itself, and so dispense with the attendant now required in the special van.

The fiftieth anniversary of the birth of Philipp Reis, the inventor of the telephone which bears his name, was celebrated by the Elektrotechnische Gesellschaft of Frankfort on January 7 by a special meeting in the afternoon, followed by a banquet, to which the son of the deceased inventor and a number of his surviving scientific friends and comrades were invited. A memorial discourse was pronounced by Herr Postrath Grawinkel, dwelling on the inventions of Reis and his now generally admitted claims. At the banquet a speech was made by Dr. Petersen, president of the Physical Society of Frankfort, on behalf of that body, at whose session in 1861 the telephone first saw the light. The speeches and toasts lasted till after midnight.

We mentioned last week that the Scottish Fishery Board on the recommendation of Prof. Cossar Ewart had taken steps to utilise the abundant machinery at their disposal for collecting material that will assist in solving some of the important fish problems. As a firstfruit of this organisation a splendid specimen of a torpedo was forwarded to the University of Edinburgh by the fishery officer at Wick on Saturday last. Prof. Ewart exhibited this, apparently the only torpedo ever found off the Scottish coast, at the last meeting of the Royal Physical Society of Edinburgh (January 16). After giving a short account of the torpedo group, Prof. Ewart mentioned that the specimen exhibited was taken about five miles off Lybster, that it was 28 inches in length and 19½ inches across the pectoral fins, and that it belonged to the species *hebetans*, several specimens of which have been found in the English Channel. This torpedo will in all probability be presented by the Fishery Board to the Edinburgh Museum of Science and Art.

The members of several scientific societies in the east of Scotland having had under consideration the advantages that would result from a federation of the various societies, believing that thereby the value of their scientific work would be greatly increased and their objects promoted, have determined to call a meeting of delegates from the various scientific bodies in the east of Scotland, to be held at the Perthshire Natural History Museum, Perth, on Saturday, February 9 next. At this meeting it is purposed to consider the question of federation, and how it may best be carried out, and also to adopt a constitution, and to arrange for a first general meeting. Some of the advantages of such an association are thus briefly stated :—(1) Increased value of work by having an aim in common ; (2) Increased zeal amongst members by definite work being put before them ; (3) Improvements in method of carrying out excursions ; (4) Increased facilities for intercourse amongst members of the different societies. The idea of a federation of societies is not a new one. In England the societies of three large districts have formed associations, with excellent results ; and though in Scotland no unions of a similar nature have yet been formed, the joint meetings (inaugurated by the Inverness Scientific Society) of some of the northern societies, which have taken place annually during the past two or three years, have been a step in the same direction.

THE Geographical Society at Antwerp has given a reception to the distinguished geographer, Dr. Chavanne, editor of the *Mittheilungen* of the Vienna Geographical Society. He has undertaken the task of drawing up a complete map of the Congo territory, showing the stations of the African Association. He will leave for the Congo at the beginning of next month.

THE first maps of the Algerian survey have been published and presented to the Paris Academy by Col. Perrier.

THE largest ice cavern in Carniola has lately been discovered by Prof. Linhart of Laibach, having hitherto been known only to a small circle of woodcutters and hunters. It is now called the Friedrichstein Cavern, and can be reached in about two to three hours from Gottschee. The upper aperture is large and rectangular, the back is formed by a limestone rock rising some 80 metres perpendicularly; there is also a colossal gate fringed by icicles some metres in length. The sides are very steep. The area of the cave is about 450 square metres, nearly circular in shape, the level ground being covered with ice several feet deep. Altogether the cave seems to offer one of the grandest aspects imaginable.

NEWS about the Russian expedition to Western Africa under Herr Schulz von Rogosinski was communicated at a recent meeting of the Berlin Geographical Society. The expedition has investigated the district north and east of the Cameroon Mountains, and discovered a large native settlement or town, Kumba by name, on the Mungo River east of the mountains mentioned. They intend to penetrate still further to the east. Dr. Pauli and Dr. Passavant of Basle have started also for the same districts on an exploring tour. A letter was also read, dated Ibi, September 30, in which Robert Flegel makes some official business communications.

THE additions to the Zoological Society's Gardens during the past week include a Black-handed Spider Monkey (*Ateles geoffroyi*) from Central America, presented by Mr. Colin Wm. Scott; two Yellow-bellied Liothrix (*Liothrix luteus*) from India, a Goldfinch (*Carduelis elegans*), British, presented by Mrs. Edwards; an Indian Elephant (Mottled Variety) (*Elephas indicus* ♂) from Burmah, a Slow Loris (*Nycticebus tardigradus*) from Sumatra, a Gray Ichneumon (*Herpestes griseus*) from India, deposited; a Rufous-necked Wallaby (*Halmaturus ruficollis*) from New South Wales, a Brush Bronze-wing Pigeon (*Phaps elegans*) from Australia, received on approval; an Axis Deer (*Cervus axis*), three Brown-tailed Gerbilles (*Gerbillus erythrurus*), a Babirussa (*Babirussa alfurus*), born in the Gardens.

OUR ASTRONOMICAL COLUMN

A SOUTHERN COMET.—A telegram from Melbourne addressed to Prof. Krueger of Kiel, editor of the *Astronomische Nachrichten*, notifies the discovery of a small comet on January 12 in R.A. 22h. 40m., and N.P.D. 130° 8′, and consequently in the constellation Grus. It is stated to be moving quickly to the south-east.

Possibly this comet may add to the very small number of cases where one of these bodies has been telescopically discovered in the other hemisphere, and the elements of the orbit have wholly depended upon southern observations. We can call to mind only two such instances: (1) the comet of 1824 detected by the late Carl Rümker at Parramatta, and observed there by him and by Sir Thomas Brisbane, the founder of that observatory, and Governor of the Colony. The orbit was first calculated by Rümker, and has lately been more completely investigated from the Parramatta observations by Dr. Doberck; (2) the comet of 1833, discovered by Dunlop (Rümker's successor) at Parramatta at the end of September, and observed there from October 1 to 16: orbits by Henderson, Peters, and Hartwig.

PONS' COMET.—For the convenience of readers who are observing in the southern hemisphere we subjoin an ephemeris of this comet, deduced from the provisionally corrected ellipse of MM. Schulhof and Bossert. The positions are for Greenwich mean noon:—

1884		R.A. h. m. s.	Decl. ° ′	Log. distance from Earth	Sun
Feb.	5	0 44 33	−31 38·8	9·9506	9·9024
	9	0 55 27	35 10·7		
	13	1 5 10	38 14 2	0·0019	9.9284
	17	1 14 0	40 54·4		
	21	1 22 14	43 15·8	0·0440	9 9628
	25	1 30 7	45 22·4		
	29	1 37 52	47 17·2	0·0772	0·0011
March	4	1 45 40	49 2·8		
	8	1 53 40	50 41·4	0·1029	0·0401
	12	2 2 0	52 14·9		
	16	2 10 50	53 44·6	0·1225	0·0781
	20	2 20 19	55 11·3		
	24	2 30 34	56 36·0	0·1374	0·1143
	28	2 41 44	57 59·4		
April	1	2 53 58	59 22·0	0·1489	0·1483
	5	3 7 27	60 43·6		
	9	3 22 23	62 4·1	0·1583	0·1800
	13	3 38 59	63 22·5		
	17	3 57 27	64 37·4	0·1668	0·2095

The theoretical intensity of light on February 5 is sixty-nine times that on the day of discovery; on April 17 only six times the same. Probably the comet may be discernible with the naked eye until the end of February.

Dr. G. Müller of the Astro-physical Observatory at Potsdam records a second remarkably sudden increase in the brightness of this comet. On January 1 at 5h. 47m. M.T. its appearance was very similar to that of the preceding days, the nucleus large and diffused; photometric comparisons showed that it was following pretty nearly in the calculated light-curve, and harmonised with the measures on December 29 and 30. At 7h. 20m. he was astonished at the altered aspect of the comet. In place of the previously diffused nucleus, there was now an almost stellar point, equal in brightness to a star of the seventh magnitude, so that he was at first under the impression that a bright star was seen through the comet. By comparisons with two neighbouring stars, estimated in the *Durchmusterung* 7·0 and 6·8, the following magnitudes were determined:—

	h. m.			h. m.	
At	7 28	7·53 m.	At	8 27	7·03 m.
	7 41	7·35		8 38	7·00
	7 58	6 97		9 0	7·13
	8 7	6·89		9 7	7·33

With the help of a curve the observations appeared to fix the maximum of the development of light to 8h. 12m. M.T. at Potsdam corresponding to 7h. 20m. Greenwich M.T. At 9h. 30m. the comet's aspect had again changed and resembled that presented at the previous day's observations. The whole variation amounted to about 1·3 mag. On that evening the comet's distance from the sun was 0·90, and that from the earth 0·665.

Attention will be no doubt directed in the other hemisphere to these abnormal variations in the light of the comet. It will be remembered that the first remarkable change occurred about September 22, three weeks after the discovery by Mr. Brooks, when the distance from the sun was 2·18, and from the earth 2·14.

PROFESSOR HAECKEL ON THE ORDERS OF THE RADIOLARIA[1]

II.

[THE following translation of a recent paper of mine, by Miss Nellie Maclagan, has been revised by myself.—ERNST HAECKEL.]

Systematic Survey of the 4 *Orders,* 10 *Sub-orders, and* 32 *Families of the Class Radiolaria.* (Compare the former survey of the families in my Monograph, 1862, and in "Prodromus," *l.c.* 1881).

1. Order I. ACANTHARIA, Hkl. (*Acantharia*, Hkl., 1881 = *Acanthometrcæ*, Hertwig, 1879 = *Panacantha*, Hkl., 1878).

Central capsule originally (and usually permanently) spherical; nucleus usually early divided into numerous small nuclei. Cap-

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[1] "Separat-Abdrück aus den Sitzungsberichten der Jenaischen Gesellschaft für Medicin. und Wissenschaft." Jahrg. 1883. Sitzung. von 16 Februar. Concluded from p. 276.